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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,168	06/18/2007	Chul Ung Kim	68284-236040	6066

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EXAMINER	
ELBIN, JESSE A	

ART UNIT	PAPER NUMBER
2615	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,168	KIM, CHUL UNG	
	Examiner	Art Unit	
	JESSE A. ELBIN	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06 December 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the units used, for example in paragraph [25] did not print correctly in the specification as published by WIPO (see WO 2005/086528). A copy of the specification received 30 August 2006 appears to indicate the missing units as "cm" in all instances.

Appropriate correction is required.

Claim Objections

2. Claim 3 is objected to because of the following informalities: the units of current density did not print correctly in the claims as published by WIPO. A separate copy of the claims, also received 30 August 2006 indicate the units to be "mA/cm^2" For the purposes of the art rejection below, of the art rejection below, the last line of claim 3 will read "between about 0.01 mA/cm^2 and about 100 mA/cm^2.

3. Claim 3 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 3 is drawn to a method of manufacturing the speaker of claim 1, wherein the method steps would not alter the structural limitations expressed in claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho et al. (WO 03/033759 ('759)) in view of Lee et al. (US Patent 4,868,447 ('447)) in view of Parrella et al. (US Patent 6,215,884 ('884)).

Regarding claim 1, Cho teaches sound equipment (loudspeakers; '759 page 7 lines 7-10) with a film-speaker (film loudspeaker; '759 page 1 line 23) comprising: a film-speaker unit comprising a piezoelectric film ('759 Fig. 1 #2), wherein the piezoelectric film [is] reformed ('759 page 2 line 1) by performing a surface treatment using ions ('759 page 2 line 2) with a predetermined energy under a vacuum state ('759 page 3 lines 19-22) to increase an adhesive force (*to solve the problem of low adherence of electrode materials*; '759 page 1 lines 25-28), and the electrodes are formed by depositing conductive material ("depositing the ITO electrode"; '759 page 6 lines 27-28) on [the surface] of the piezoelectric film.

Cho does not explicitly teach electrodes being formed on both surfaces of the piezoelectric film, nor both surfaces of the piezoelectric film being reformed. Further Cho does not teach a matching transformer connected with the film-speaker unit; an

amplifier connected to the matching transformer; and a power supply unit providing the amplifier with power.

In the same field of endeavor, Lee teaches forming electrodes on both surfaces of the piezoelectric film ('447 Fig. 2 #22 and #24) to allow simultaneous control and sensing of the motion of the piezoelectric element ('447 col. 5 line 66 to col. 6 line 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the reforming of a piezoelectric film as taught by Cho to reform both sides to accommodate electrodes placed on both sides of the film as taught by Lee for the benefit of allowing simultaneous control and sensing of the motion of the piezoelectric element.

Neither Cho, nor Lee explicitly teaches a matching transformer connected with the film-speaker unit; an amplifier connected to the matching transformer; and a power supply unit providing the amplifier with power.

In the same field of endeavor, Parrella teaches a matching transformer ('884 Fig. 1 #3) connected with the film-speaker unit (piezoelectric element; '884 Fig. 1 #4); an amplifier ('884 Fig. 1 #2) connected to the matching transformer ('884 Fig. 1); and a power supply unit providing the amplifier with power ('884 Fig. 2 #10-11) for the benefit of driving the piezoelectric element to produce a sound output.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the dual-electrode piezoelectric element as taught by the combination of Cho and Lee in the sound system configuration taught by Parrella for the benefit of driving the piezoelectric element to produce a sound output.

Regarding claim 2, Cho, Lee and Parrella remain as applied above.

Cho further teaches the piezoelectric film is selected from a group consisting of PVDF and derivatives thereof, polymer blends including an additive such as HFP, and VDF/TrFE ('759 page 3 lines 23-29).

Regarding claim 3, Cho, Lee and Parrella remain as applied above.

Cho further teaches the surface treatment to increase an adhesive force ('759 page 4 lines 13-14) comprising the steps of: positioning the piezoelectric film under a vacuum state ('759 page 3 line 17), wherein the degree of vacuum ranges from about 0.05 mTorr to about 10 mTorr ("in the range of 1 x 10^{-1} torr to 1 x 10^{-6} torr"; '759 page 3 line 20); and irradiating ions on the piezoelectric film ('759 page 8 line 9), wherein the ions have an energy level between about 0.2 keV and about 1.5 keV ("in the range of 10 to 10000eV"; '759 page 3 line 21) and a current density of ion beam is between about 0.01 mA/cm^2 and about 100 mA/cm^2 ("the amount of the ion beam implanted to the surface of the sample 2 is 1 x 10^{12} to 1 x 10^{20} ions/cm^2"; '759 page 3 line 22).

Regarding claim 4, Cho, Lee and Parrella remain as applied above.

Cho further teaches the ions being selected from a group consisting of oxygen, argon, nitrogen, hydrogen, mixtures including oxygen, argon, nitrogen or hydrogen, and other mixture gases ('759 page 4 lines 4-7).

Regarding claim 5, Cho, Lee and Parrella remain as applied above.

Neither Cho, Lee, nor Parrella explicitly teach the piezoelectric film being positioned at a distance of 1 cm-50 cm from an ion generation point.

Examiner takes official notice that one of ordinary skill in the art at the time of the invention would, with only a reasonable amount of experimentation would have identified a distance of 1 cm to 50 cm to be ideal based on the requirements of the design. The distance of the film from the ion generation point is dependent upon the ion generator requirements to attain a specific ion density in a specific coverage area.

Regarding claim 6, Cho, Lee and Parrella remain as applied above.

Cho further teaches the conductive material to form the electrodes being selected from a group consisting of platinum, gold, silver, copper, chromium, nickel, aluminium, ITO, IGO, AGO, sulphur compounds, mixtures including platinum, gold, silver, copper, chromium, nickel, aluminium, ITO, IGO, AGO or sulphur compounds, and a mixture including the above-described conductive material or mixture and a specific solution or material which can increase conductivity and adhesive property ('759 page 5 line 25 to page 6 line 3).

Regarding claim 7, Cho, Lee and Parrella remain as applied above.

Cho further teaches the conductive material to form the electrodes being a conductive polymer material ('759 page 5 lines 27-30).

Regarding claim 8, Cho, Lee and Parrella remain as applied above.

Parrella further teaches the electrodes made from the conductive polymer material further comprises a metal lead line formed on one side of the surface of each electrode (connecting the piezoelectric element via lead wires; '884 Fig. 2) for the benefit of making flexible contact with external components.

It would have been obvious to one of ordinary skill in the art at the time of the invention to connect lead wires as taught by Parrella to conductive polymer electrodes as taught by the combination of Cho, Lee and Parrella for the benefit of making flexible contact with external components.

Regarding claim 9, Cho, Lee and Parrella remain as applied above.

Parrella further teaches a condenser (crossover network; Fig. 12 #106), the condenser filtering a low register ("a crossover network 106 is used to slit the audio into its high and lower frequency components"; '884 col. 5 lines 52-55); a dynamic speaker installed between the amplifier and the matching transformer; and a coil positioned between the amplifier and the dynamic speaker (Fig. 11 *wherein typical electrical conductors for use in audio systems inherently act as a coil (inductor)*), the coil filtering a high register (*wherein the electrical conductor inherently acting as a coil will inherently filter a high register (act as a low-pass filter)*).

Parrella does not explicitly teach the crossover network containing a condenser (capacitor) positioned between the film-speaker unit and the matching transformer.

Examiner takes official notice that one of ordinary skill in the art would recognize the advantage of positioning the condenser between the film-speaker unit and the matching transformer in order to use a single transformer to drive multiple piezoelectric elements as taught by Parrella, while tuning each piezoelectric element to a specific output frequency range.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Martin et al. (US Patent 6,297,579) teaches using an electron gun to create specific electric fields within piezoelectric elements.

b. Ohashi (US Patent 6,251,472) teaches a method of depositing electrode material onto a piezoelectric substrate.

c. Ashtiani et al. (US PGPub 2002/0076061) teaches integrating piezoelectric elements into automotive interior panels.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSE A. ELBIN whose telephone number is (571)270-3710. The examiner can normally be reached on Monday through Friday, 8:00am to 5:00pm EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Suhan Ni can be reached on (571) 272-7505. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. A. E./
Examiner, Art Unit 2615

/Suhan Ni/
Primary Examiner, Art Unit 2614